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Nakatani et al.

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[54] **IMAGE EDITING SYSTEM**

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[73] Assignee: **Minolta Camera Kabushiki Kaisha**, Osaka, Japan

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[30] **Foreign Application Priority Data**

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[51] **Int. Cl.**[4] **G03G 15/00**
[52] **U.S. Cl.** ..... **355/14 R**; 355/7
[58] **Field of Search** ..... 355/14 R, 3 R, 7, 14 C, 355/133

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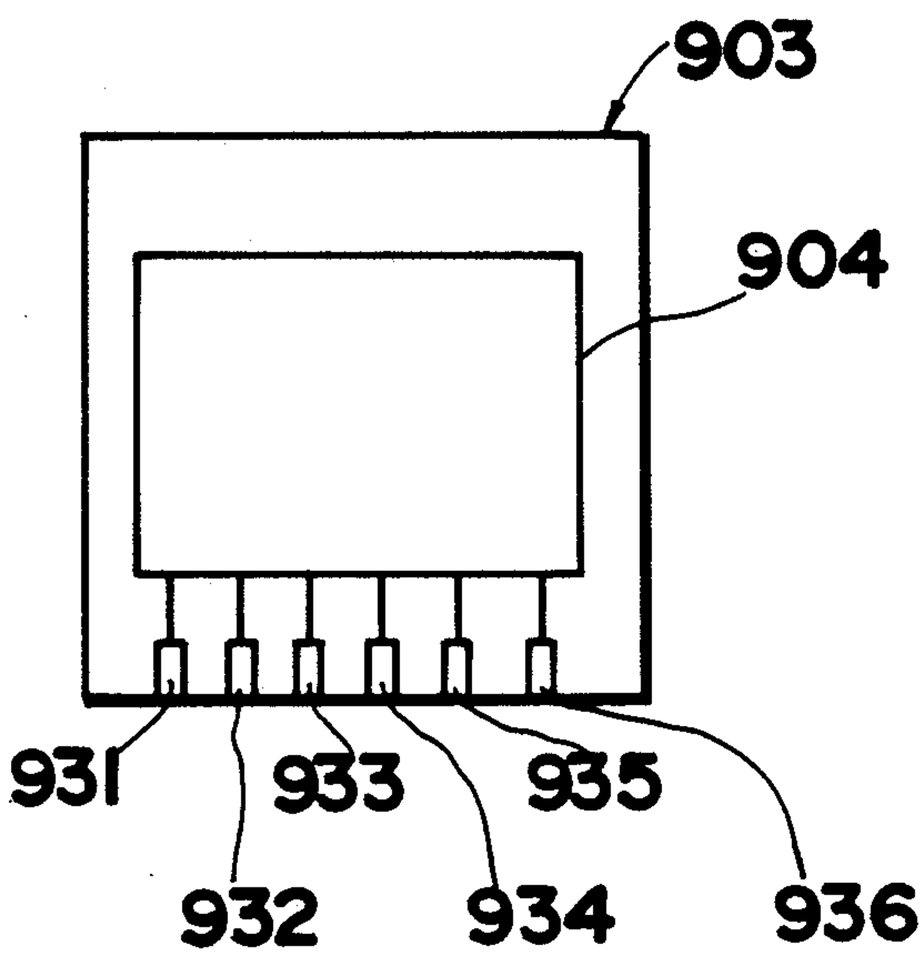
Primary Examiner—R. L. Moses

Attorney, Agent, or Firm—Price, Gess & Ubell

[57] **ABSTRACT**

An image editing system which comprises a memory device capable of storing editing data in memory, copying device to perform edited-image copying based on data stored in the memory device which is attached to the copying device, and an input device, which is separate from the copying device, for entering edited data in the memory device.

12 Claims, 8 Drawing Sheets



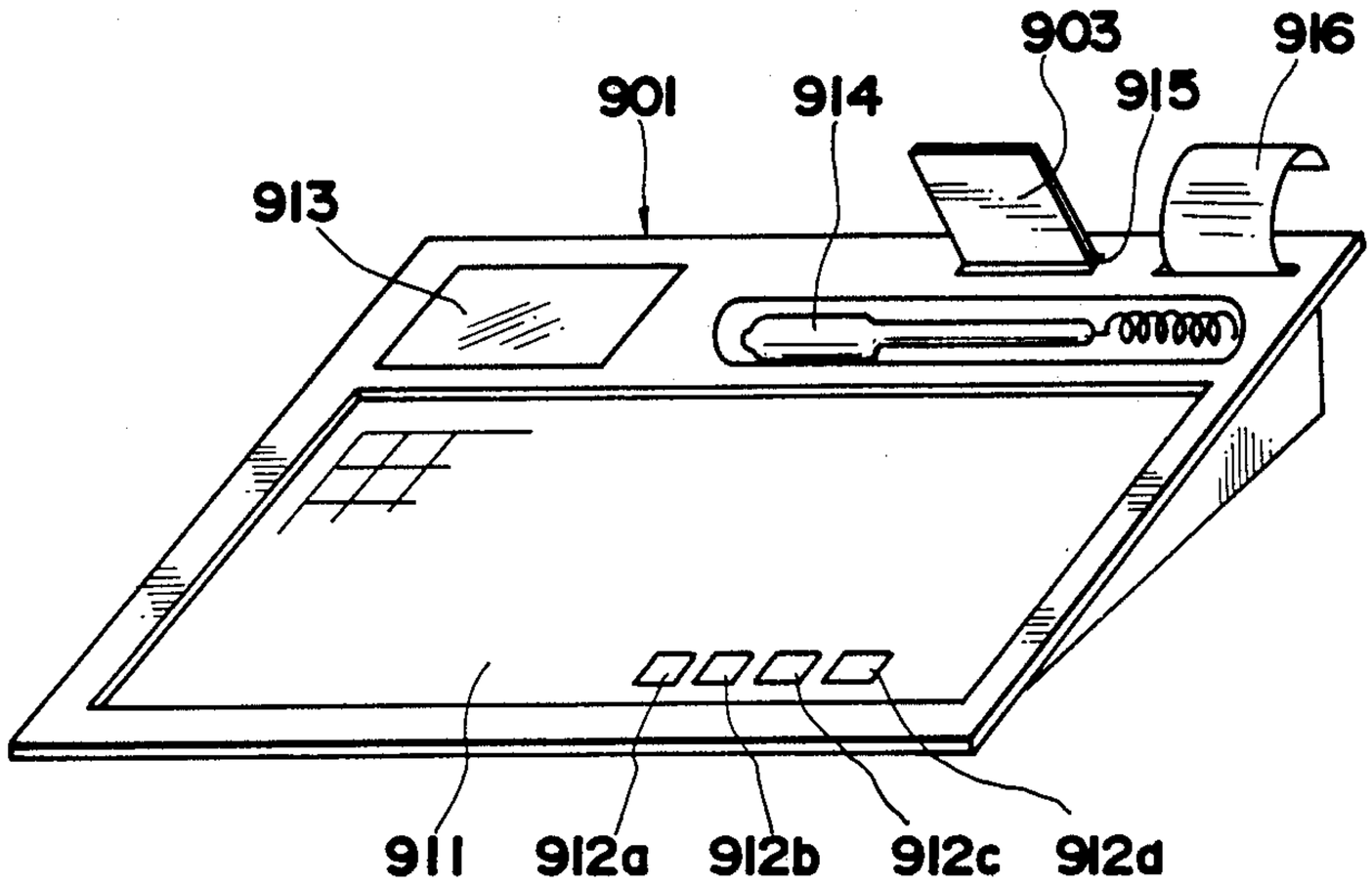


FIG.1

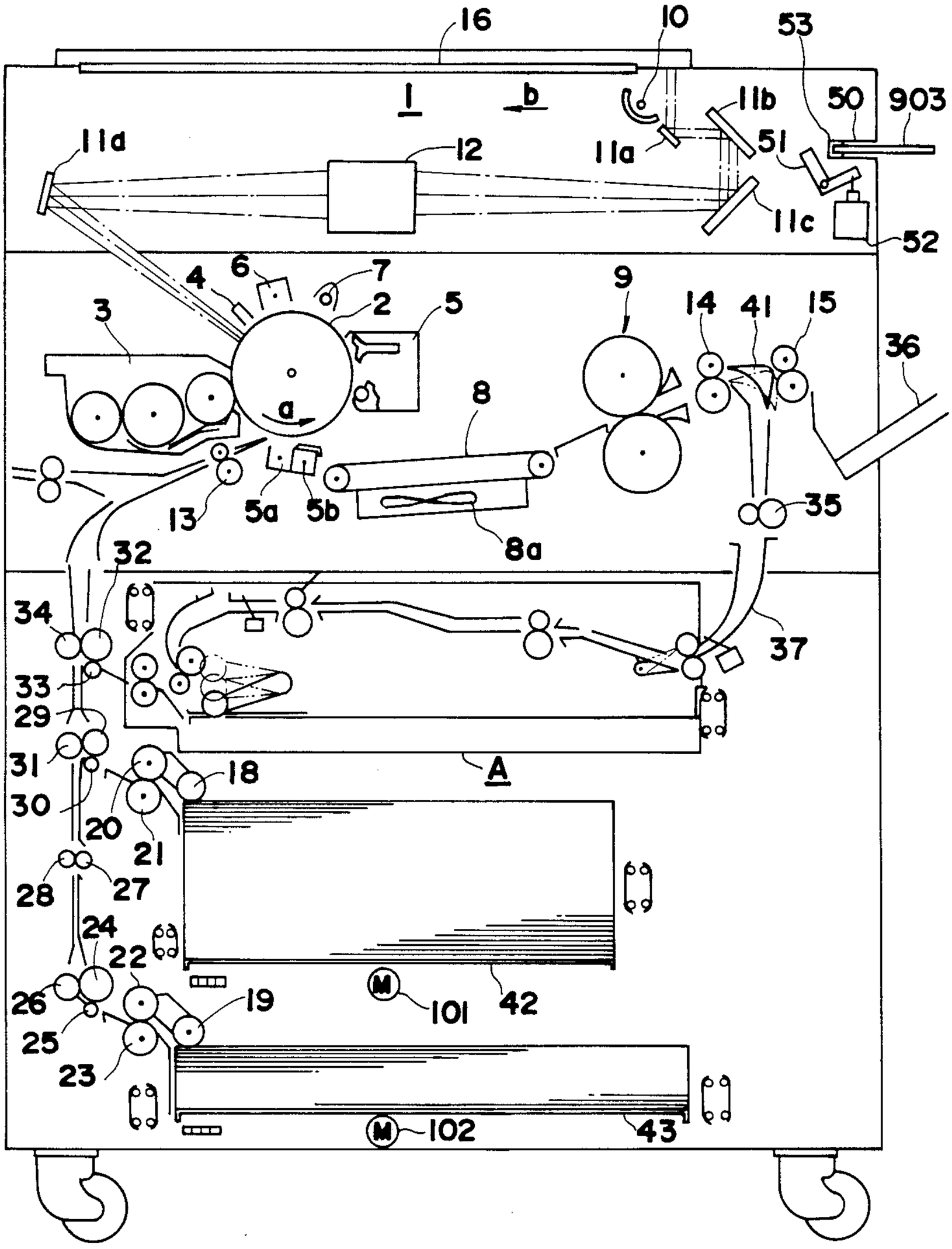

16
10
53
1
b
11b
50
903
11a
12
11a
51
11c
52
4
6
7
2
5
9
14
41
15
36
3
a
8
13
5a
5b
8a
35
32
34
37
33
29
31
18
A
30
20
21
28
27
24
22
26
19
25
23
M
101
42
M
102
43

FIG.2

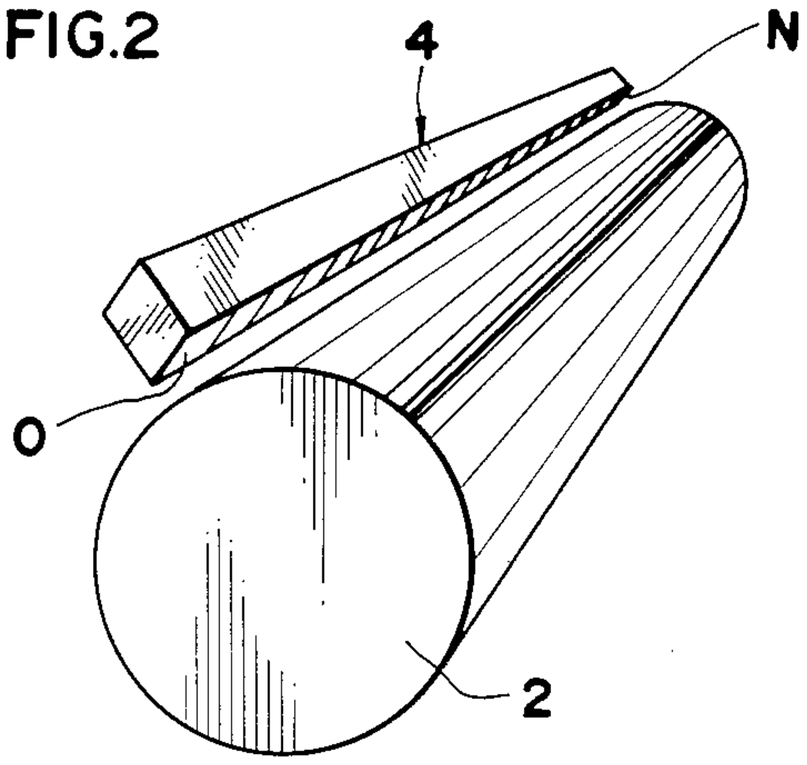

4
N
O
2

FIG.3

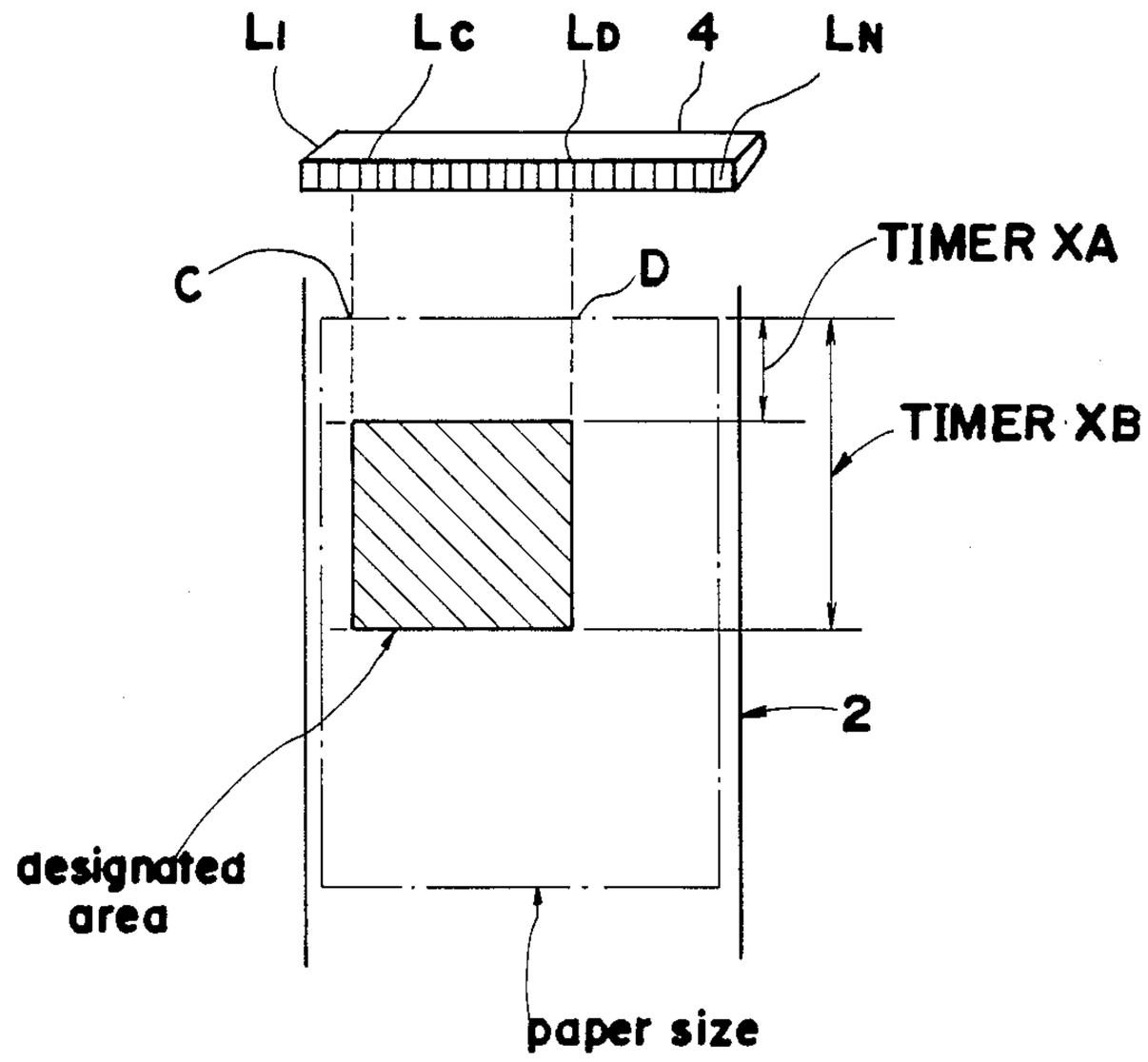

LI
Lc
LD
4
LN
C
D
TIMER XA
TIMER XB
2
designated area
paper size

FIG.4

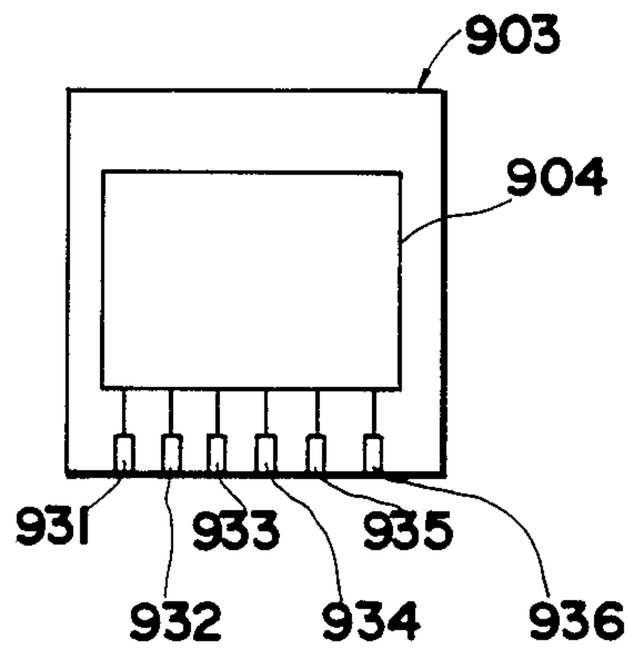

903
904
931
933
935
932
934
936

FIG.5

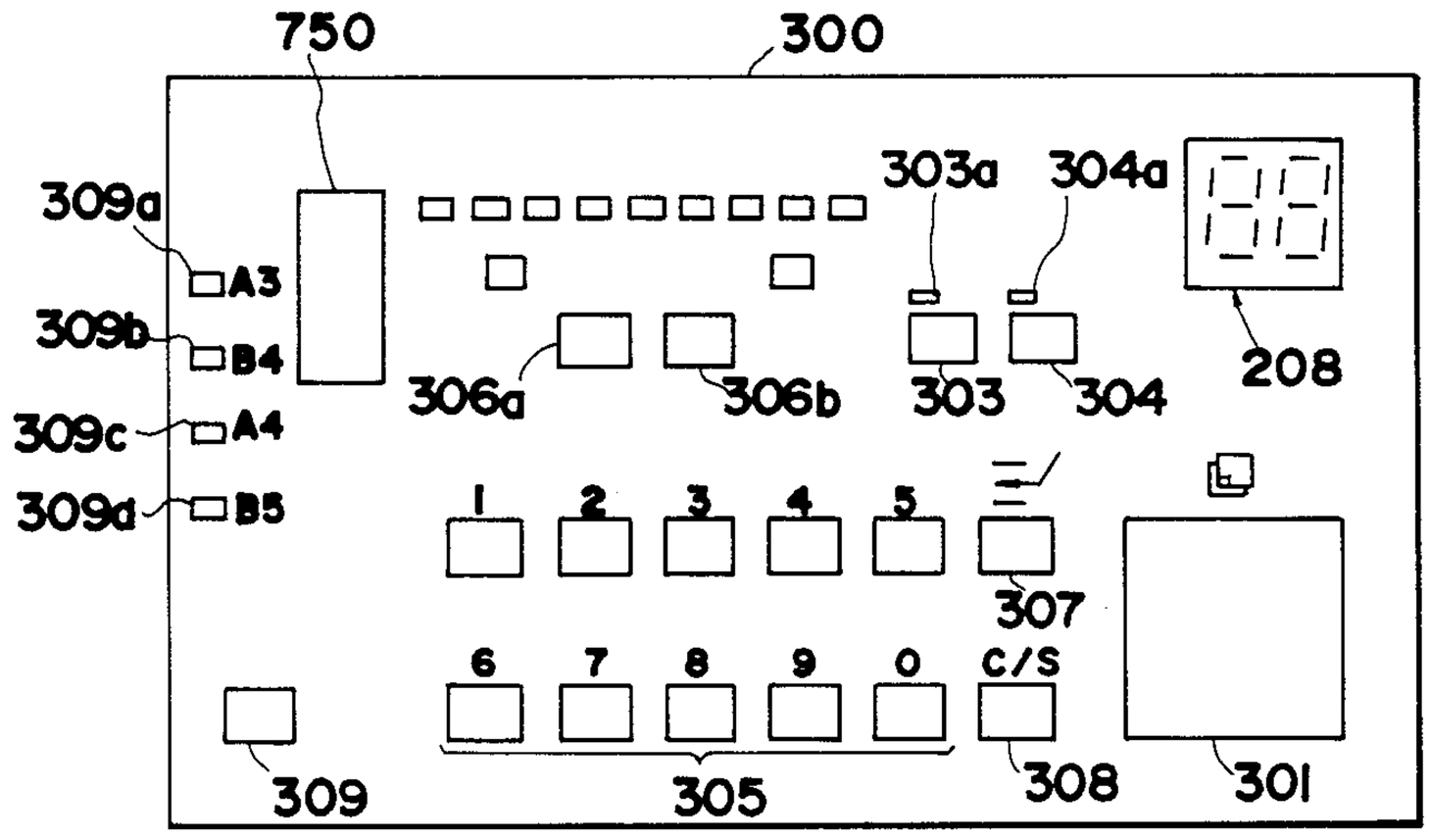

750
300
309a
A3
309b
B4
309c
A4
309d
B5
303a
304a
306a
306b
303
304
208
1
2
3
4
5
307
6
7
8
9
0
C/S
309
305
308
301

FIG.6

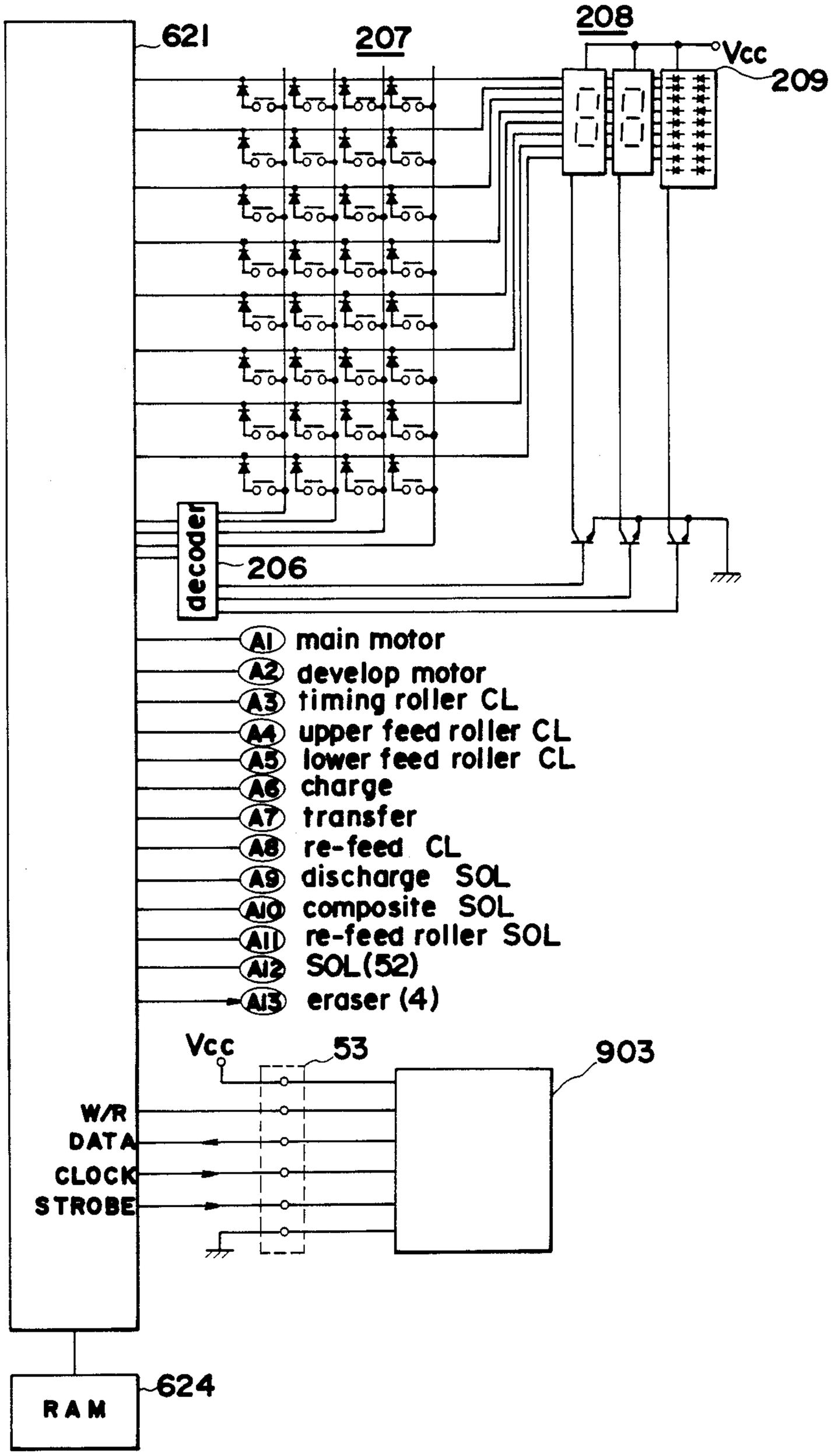

621
207
208
Vcc
209
decoder
206
A1 main motor
A2 develop motor
A3 timing roller CL
A4 upper feed roller CL
A5 lower feed roller CL
A6 charge
A7 transfer
A8 re-feed CL
A9 discharge SOL
A10 composite SOL
A11 re-feed roller SOL
A12 SOL(52)
A13 eraser (4)
Vcc
53
903
W/R
DATA
CLOCK
STROBE
RAM
624

FIG.7

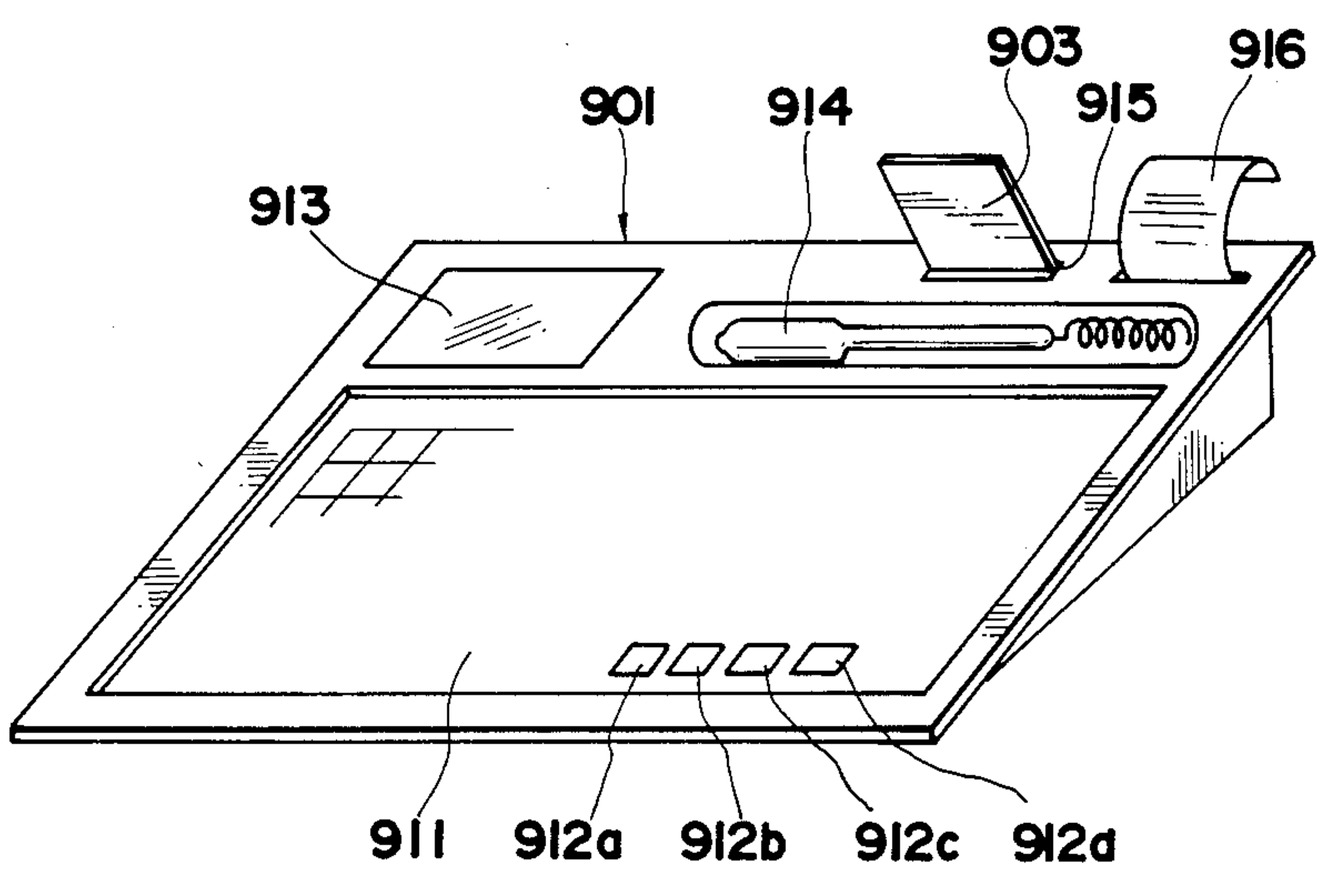


FIG.8

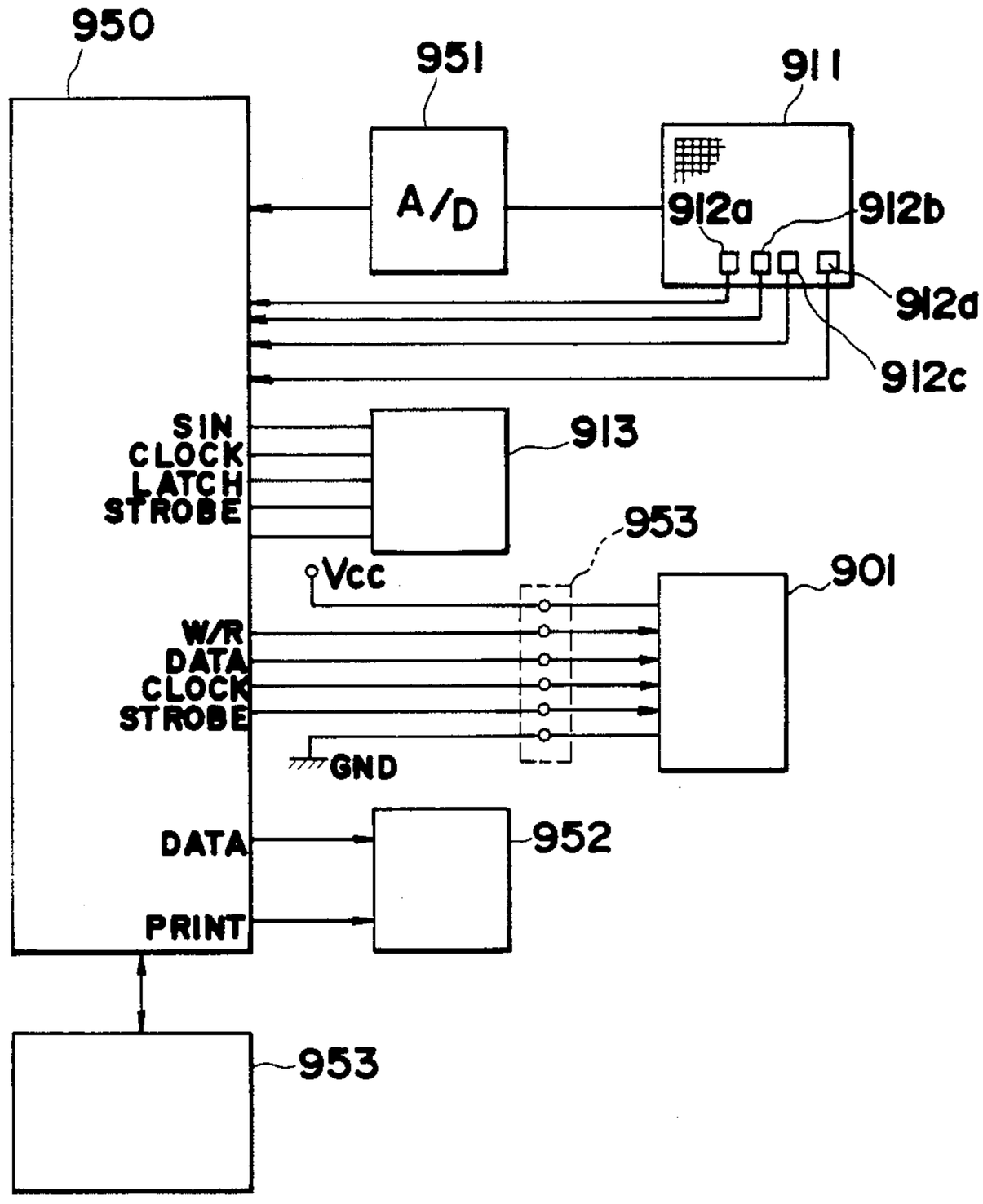

950
951
911
A/D
912a
912b
912d
912c
SIN
CLOCK
LATCH
STROBE
913
953
Vcc
901
W/R
DATA
CLOCK
STROBE
GND
DATA
952
PRINT
953

FIG.9

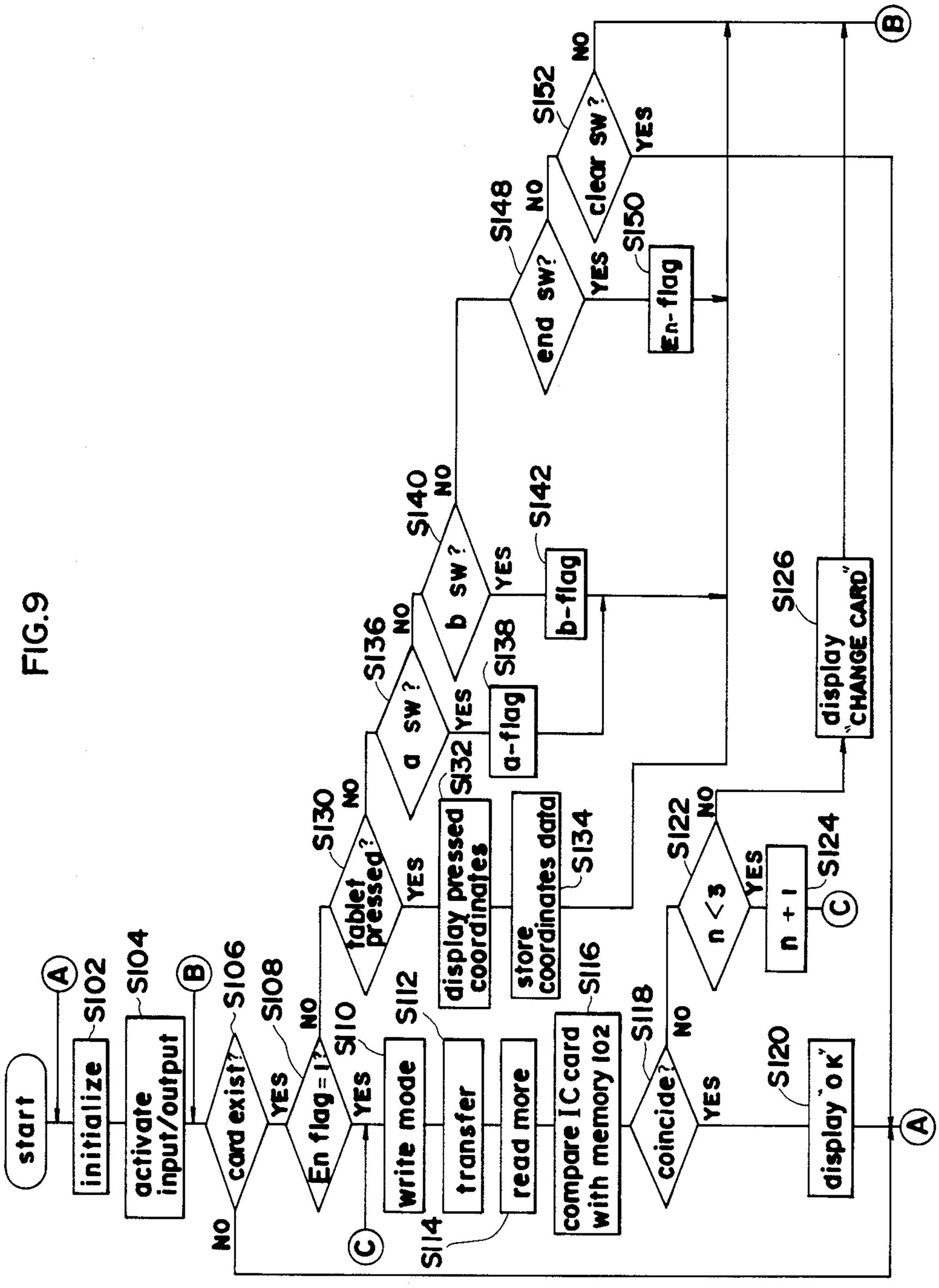

start
A
initialize
S102
activate input/output
S104
B
card exist?
S106
NO
YES
En flag = 1?
S108
NO
YES
C
write mode
S110
transfer
S112
read more
S114
compare IC card with memory 102
S116
coincide?
S118
NO
YES
n < 3
S122
NO
YES
n + 1
C
S124
display "O K"
S120
A
display "CHANGE CARD"
S126
tablet pressed?
S130
NO
YES
display pressed coordinates
S132
store coordinates data
S134
a sw?
S136
NO
YES
a-flag
S138
b sw?
S140
NO
YES
b-flag
S142
end sw?
S148
NO
YES
En-flag
S150
clear sw?
S152
NO
YES
B

FIG.10

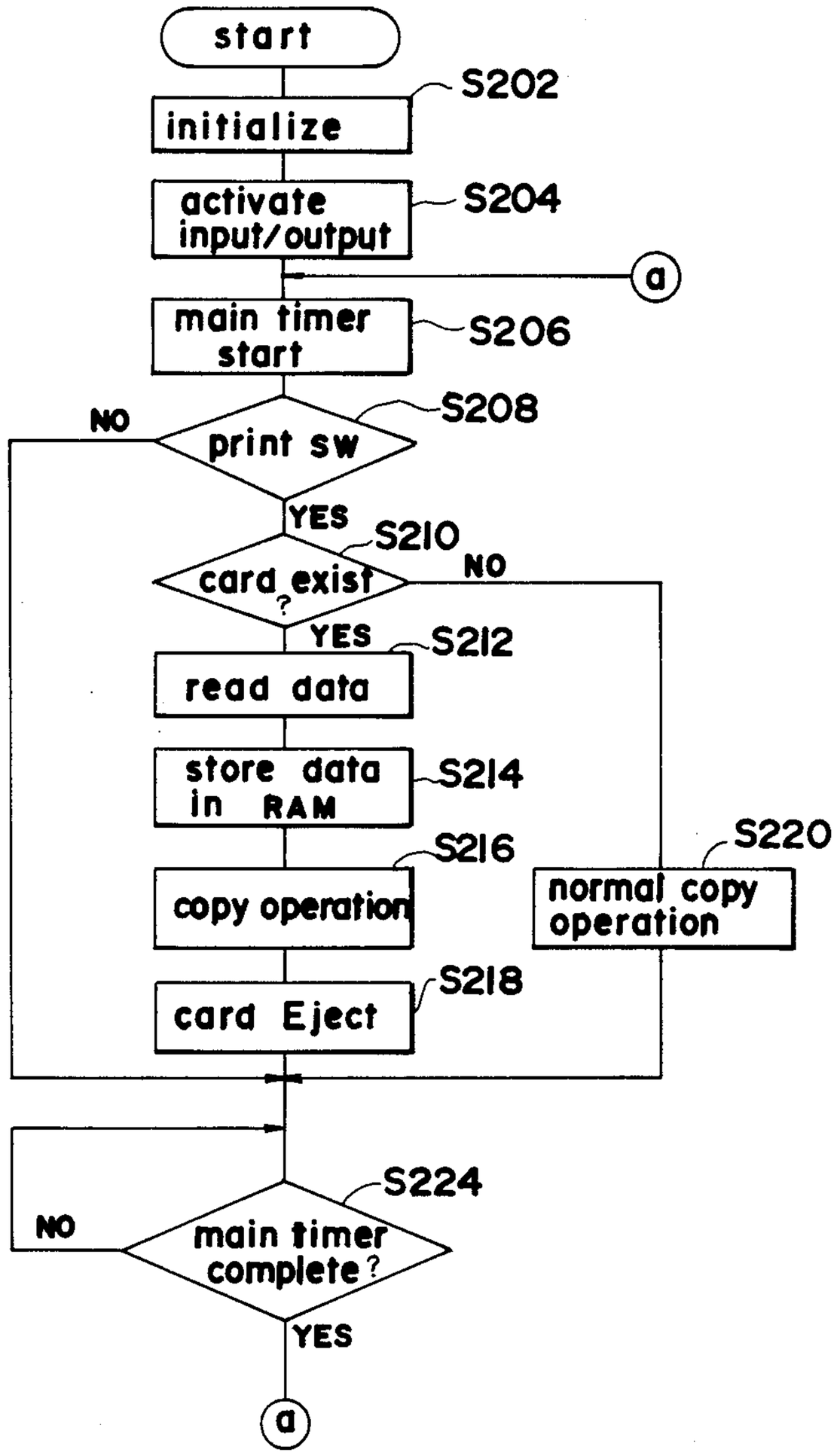

start
S202
initialize
activate input/output
S204
a
main timer start
S206
S208
NO
print SW
YES
S210
card exist ?
NO
YES
S212
read data
store data in RAM
S214
S216
copy operation
S220
normal copy operation
card Eject
S218
S224
NO
main timer complete ?
YES
a

IMAGE EDITING SYSTEM

BACKGROUND OF THE INVENTION

(1) Field Of The Invention

The present invention relates to an image editing system comprising, in detail, a memory card for storing the edited-image data in memory, copying apparatus with image editing capability, and an input unit for storing data in memory.

(2) Prior Art

There are many proposals for conventional electrophotographic copy machines having editing functions that allow editing images in specific regions of an original document and some have been actually produced. Many conditions must be entered in specific sequences in order to perform edited-image copying. Accordingly, the copy machine is occupied for long periods by a single user editing images for copying, while other potential users are forced to wait for long periods to use the machine and, consequently, the use-efficiency of the copy machine is reduced.

SUMMARY OF THE INVENTION

An object of the present invention is to provide an image editing system capable of highly efficient edited-image copying.

The aforesaid object is accomplished by an image editing system comprising a memory card capable of storing edited-image data in memory, copying device to perform edited-image copying based on data stored in said memory card which is removable, and an input unit for entering edited data in a memory card which is removable.

BRIEF DESCRIPTION OF THE DRAWINGS

These and other objects, advantages and features of the invention will become apparent from the following description thereof taken in conjunction with the accompanying drawings which illustrate specific embodiments of the invention.

In the following description, like parts are designated by like reference numbers throughout the several drawings.

FIG. **1** is a section view showing the abbreviated construction of a copy machine having an edited-image copy function.

FIG. **2** is a perspective illustration showing the relationship of the photosensitive drum and the eraser.

FIG. **3** is an illustration to explain the eraser operation.

FIG. **4** is an illustration showing an abbreviated construction of the memory card.

FIG. **5** is a drawing showing the copy machine operation panel layout.

FIG. **6** is a circuit diagram showing an abbreviated construction of the copy machine control circuit.

FIG. **7** is a perspective diagram showing the input unit.

FIG. **8** is a circuit diagram showing the abbreviated construction at the input unit control circuit.

FIG. **9** is a flow chart showing the procedure for entering editing data to the memory card.

FIG. **10** is a flow chart briefly showing the copy machine operating procedure.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

FIG. **1** shows the construction of a copy machine having editing functions. This copy machine comprises copy paper storage sections **42** and **43** and an intermediate tray unit A in a lower level, an image forming section having a photosensitive drum **2** provided centrally therein in an intermediate level, and an optical system **1** in an upper level, said copy machine having composite and duplex copying to intermediate tray unit A after said copy paper has undergone a first copying process

The aforesaid photosensitive drum **2** is rotatable in the direction indicated by the arrow (a) and has sequentially disposed around its periphery a sensitizing charger **6**, magnetic brush developing unit **3**, transfer charger **5***a*, separation charger **5***b*, blade-type cleaning device **5**, and an eraser lamp **7**. Photosensitive drum **2** is uniformly charged by sensitizing charger **6** via its rotation in the direction indicated by arrow (a), and has an electrostatic image formed thereon following an image exposure from optical system **1**, said electrostatic image being developed into a toner image by means of developing device **3**. In addition, sensitizing charger **6** and developing device **3** have an eraser lamp **4** provided therebetween in the proximity of photosensitive drum **2**.

Optical system **1** is capable of scanning original documents in the direction indicated by arrow (b) from the underside of glass document platen **16**, and comprises an exposure lamp **10**, movable mirrors **11***a*, **11***b* and **11***c*, image formation lens **12**, and a stationary mirror **11***d*.

The copy paper storage area comprises a top elevator-type storage section **42** and a bottom elevator-type storage section **43**. The copy paper stored in said storage sections **42** and **43** is fed in an upward direction via the actuation of either top elevator lifting motor **101** or bottom elevator lifting motor **102**, respectively, depending on which paper is being supplied.

Copy paper in storage section **42** and storage section **43** is selectively supplied sheet by sheet by guide rollers **21** and **22** via the rotation of paper roller **18** or by guide rollers **22** and **23** via the rotation of paper roller **19**, respectively, and hence said paper is fed to timing roller **13** via rollers **32** and **34** and rollers **27** and **28** by feed rollers **29**, **30**, **31** or by feed rollers **24**, **25**, **26**, respectively.

After stopping temporarily at timing roller **13**, the copy paper is fed to the transfer section in synchronized timing with the image formed on the aforesaid photosensitive drum **2**, whereupon the previously mentioned toner image is transferred to said copy paper via charging by transfer charger **5***a* and the paper is separated from the surface of said photosensitive drum **2** by means of a charge imparted by separation charger **5***b*, then the copy paper is fed via feed belt **8**, which is provided with an air suction means **8***a*, to fixing device **9** where the toner image undergoes a fixing process.

Feed roller set **14** and discharge roller set **15** disposed immediately behind the outlet to said fixing device **9** have provided therebetween a lever **41** for switching the copy paper feed path. When a simplex copy is made and the lever **41** is set in the position described by the broken line in FIG. **1**, copy paper arriving from the fixing device **9** is discharged to tray **36** from discharge roller set **15**. When a duplex or composite copy is made, however, and the lever **41** is set in the position described by the solid line in FIG. **1**, the copy paper passes from feed roller set **35**, transits guide plate **37**, and is fed

to the intermediate tray unit A described in detail hereinafter.

On the other hand, following the image transfer, photosensitive drum **2** has the residual toner removed therefrom via a cleaning device **5**, and also has the residual charge removed therefrom via photic exposure produced by eraser lamp **7**, whereupon said drum is ready for a subsequent copying process.

An explanation of the construction of intermediate tray unit A is abbreviated herein because it is substantially the same as that disclosed by Hanada et al. in U.S. patent Ser. No. 175,612 (filed on June 18, 1986).

An opening **50** is provided at the top edge of the copy machine for the insertion of memory card **903** which stores the data for edited-image copying. The opening **50** has provided therein an ejection lever **51** for ejecting the inserted memory card and a lever-actuating solenoid **52**. In addition, the opening **50** has provided therein a connector **53** for electrically connecting the memory card to the copy machine.

FIG. **2** shows the positional relationship of eraser **4** and photosensitive drum **2**. FIG. **3** is an illustration explaining the circumstances for erasing the image of a specific area via eraser **4**. Eraser **4** is provided with an LED (light emitting diode) array comprising a total of "N" individual LEDs disposed in a single row, and said eraser **4** eliminates the charge in a corresponding region on photosensitive drum **2** by selectively emitting a specific quantity of light from various LEDs, thus erasing the electrostatic image in a particular region.

For example, suppose there are a total of "N" LEDs labeled, from left to right, L1, L2, . . . LN, as shown in FIG. **3**, then if LEDs LC to LD are switched ON from the instant timer A reaches completion until the instant timer B reaches completion, the charge is eliminated within the area on photosensitive drum **2** which corresponds to the shaded portion in the drawing, and an electrostatic image is not formed within said area. Details of the illumination control of eraser **4** are disclosed by Ohira et al. in U.S. patent application Ser. No. 5,743 (filed on July 21, 1987) and, therefore, a detailed explanation of same is abbreviated herein.

FIG. **4** shows the construction of memory card **903**. Memory card **903** comprises an EEPROM (Electrically Erasable and Programmable Read Only Memory) which is provided with a power terminal **931**, write/-read terminal **932**, data terminal **933**, clock terminal **934**, strobe terminal **935**, and a grounded terminal **936**.

FIG. **5** is an explanatory drawing which shows a portion of the operation panel of the aforesaid copy machine.

The keys illustrated in the drawing are: print key **301**, paper size selection key **309** and indicators **309***a* to **309***d*, ten numerical input keys **305**, interrupt key **307**, clear/-stop key **308**, density setting keys **306***a* and **306***b*, duplex mode key **303** and indicator **303***a*, composite mode key **304** and indicator **304***a*, display section **208**, and copy paper residual and capacity indicator **750**.

The aforesaid copy machine assigns copy operating conditions and operation modes by means of the operation of the various keys of the operation panel, and also provides an edit-image copy mode in accordance with data stored in memory card **903**.

FIG. **6** shows the copy machine control circuit centrally disposed in microcomputer **621**. Microcomputer **621** has connected thereto via decoder **206** a switch matrix **207**, comprising the various keys on operation panel **300** and various sensors, copy number display section **208**, and display section **209**.

The microcomputer **621** port A1–A13 has connected thereto a main motor, developing motor, timing roller clutch, upper feed roller clutch, lower feed roller clutch, sensitizing charger, transfer charger, re-feed clutch, discharge solenoid, composite solenoid, re-feed roller solenoid, card ejection solenoid, and an image interval eraser. In addition, microcomputer **621** W/R data, clock and strobe ports have connected thereto via connector **53** a memory card **903**. Also, RAM **624** is connected to microcomputer **621**.

FIG. **7** shows input unit **901** for entering editing data to memory card **903**. Input unit **901** is a stand-alone module which is independent of the copy machine, said unit comprising tablet **911** that is capable of entering coordinate data via the application of pressure to positions on said tablet, trimming key **912***a* which assigns the trimming mode for copying the image within a specified area, masking key **912***b* which assigns the masking mode for erasing the image within a specified area, end key **912***c* which terminates the coordinate data input process, clear key **912***d* which erases the input coordinate data, display section **913** which displays the input coordinate data and selection modes, stylus **914** for applying pressure to tablet **911**, and an insert section **915** for memory card **903**. Insert section **915** has provided therein a connector **953** for electrically connecting memory card **903** and input unit **901**. Furthermore, input unit **901** has provided therein in a internal area a small printer **952**. The small printer **952** prints the information displayed in display section **913** on recording paper **916**.

FIG. **8** is a circuit diagram showing the control circuit for input unit **901**, said control circuit being centrally provided in microcomputer **950**. Microcomputer **950** has a tablet **911** connected thereto via an A/D converter **951**. Keys **912***a* to **912***d*, display section **913** and printer **952** are also connected to microcomputer **950**. Memory card **903** is connected to microcomputer **950** via connector **953**, said connector being a RAM connector.

FIG. **9** is a flow chart showing the processing sequence for storing the editing data in memory card **903** using the input unit **901**.

First, in step **S102**, microcomputer **950** is initialized and the input/output is activated in step **S104**. Then, in step **S106**, the existence of memory card **903** is determined (a determination is made as to whether or not memory card **903** has been inserted into insert section **915**, said card **903** being connected to input unit **901** via RAM connector **953**).

If card **903** is not present, then the routine returns to step **S102**; if said card **903** is present, then the routine continues to step **S108**.

In step **S108**, the end flag (En-flag) is examined. The En-flag is set by depressing the end key after completing the data input via the editing input unit **901**.

When the En-flag is set, the routine continues to steps **S110** to **S126** and the data are stored in memory card **903**. First, the write mode is set (**S110**) and the data stored in RAM **953** and the flag status are stored in the memory card **903** (**S112**). Then, the write mode is set (step **S114**), and the data stored in memory card **903** are read (**S116**). In step **S118**, the data stored in RAM **953** and the data read from memory card **903** are checked to determine whether or not they coincide (**S118**).

When said data coincide, the routine continues to step **S120** because the data were correctly stored in memory card **903**, and an "OK" notice is displayed in display section **913**.

When said data do not coincide, the routine continues to step **S122** and beyond. The routine processes steps **S110** to **S118** up to three times and if said data do not coincide by the third process, the memory card **903** is determined to be defective and a "replace card" notice is displayed (**S126**).

When the En-flag is lowered in the aforesaid step **S108**, the routine continues to step **S130** and beyond where coordinate data are input. First, in step **S130**, a check is run to determine whether or not pressure has been applied to tablet **911** via stylus **914**. If data have been entered, the routine progresses to step **S132** and beyond; if the input coordinate data are not displayed, then said coordinate data are stored in memory **953** (**S134**).

When there is no tablet input in step **S130**, the routine progresses to step **S136** and beyond where a check is made for input from keys **912***a* to **912***d* and the flags are set to correspond with said key input, i.e., when trimming key **912***a* is depressed (step **S136**), the "a" flag is raised (**S138**); when masking key **912***b* is depressed (**S140**), the "b" flag is raised (**S142**); when the end key **912***c* is depressed (**S148**), the En-flag is raised (**S150**); and when the clear key **912***d* is depressed the routine returns to step **S102**.

Editing data are input to memory card **903** according to the aforesaid sequence. Memory card **903**, having the editing data entered therein, is extracted from the insert section **915** of the input unit **901**, said card being subsequently inserted into opening **50** of the copy machine. Thereupon, the copy machine performs the edited-image copying process in accordance with the editing data stored in memory card **903**.

FIG. **10** is a flow chart showing the actual processing performed via microcomputer **621** of the copy machine.

First, in step **S202**, microcomputer **621** is initialized and then, in step **S204**, the input/output is activated. Next, the main timer is set which defines the time period for one routine (**S206**), and the existence of print switch input is determined in step **S208**.

When print switch input exists, a check is made in step **S210** to determine whether or not the memory card **903** is inserted into opening **50**. If not, a normal copy operation is processed, the completion of the main timer is awaited (**S224**), and the routine returns to the previously described step **S206**. When it is determined that memory card **903** is present in step **S210**, processing is performed in accordance with the data from card **903**, i.e., the data from memory card **903** are read (**S212**) and stored in RAM **624** (**S214**), the eraser **4** is controlled based upon said stored data, and the copy operation is processed (**S216**). Following the completion of the copying operation, power is supplied to solenoid **206** and the memory card **903** is ejected from the insert section **25**.

Thereafter, the routine continues to step **S222**. In addition, memory card **903** may also be ejected immediately after the data stored therein have been read.

Although the present invention has been fully described by way of example with reference to the accompanying drawings, it is to be noted that various changes and modifications will be apparent to those skilled in the art. Therefore, unless otherwise such changes and modifications depart from the scope of the present invention, they shall be construed as being included therein.

What is claimed is:

1. An image editing system comprising:

a copy device including a document support table for supporting an original document to be copied and image forming means capable of copying an arbitrary area of the original document;

an input device separate from said copy device for inputting area data which define an area of the original document;

a memory device which is attachable to and detachable from said copy device and said input device and is capable of storing the input area data therein and feeding out the stored data therefrom;

said memory device storing the input area data when said memory device is attached to said input device;

said memory device feeding out the stored data therefrom to said copy device when said memory device is attached to said copy device; and

a control device for controlling said copy device so as to copy the area of original document defined by the data fed from said memory device.

2. An image editing system as claimed in claim **1**, wherein said input device comprises means for inputting coordinates data.

3. An image editing system as claimed in claim **1**, therein said input device comprises means for displaying the input data.

4. An image editing system as claimed in claim **1**, wherein said input device comprises means for printing the input data.

5. An image editing system as claimed in claim **1**, wherein said memory device comprises an electrically erasable and programmable read only memory.

6. An image editing system comprising:

an input device for inputting area data;

a memory for storing the input area data;

a copy device;

said input device being separate from said copy device;

said memory device being attachable to said input device and said copy device, and storing the input area data when said memory device is attached to said input device; and

said copy device including means for supporting an original document to be copied and means for forming the specific area of the original document which corresponds to the area data stored in memory device attached to said copy device.

7. An image editing system as claimed in claim **6**, wherein said input device further comprising means for confirming that the stored data is equal to the input data.

8. An image editing system as claimed in claim **7**, wherein said input device further comprising means for displaying a malfunction of the memory device when the stored data does not equal to the input data.

9. An image editing system comprising:

a copy device including a document support table for supporting an original document to be copied and an image forming means for performing an edited image copying of the original document;

an input device separate from said copy device for inputting data concerning the edited image copying;

a memory device which is attachable to and detachable from said copy device and said input device and is capable of storing the input editing data therein and feeding out the stored data therefrom

said memory device storing the input data therein when said memory device is attached to said input device;

said memory device feeding out the stored data therefrom to said copy device when said memory device is attached to said copy device; and

based on the data fed by said memory device.

10. A program copy system comprising;

a copy device including a document support table for supporting an original document to be copied and an image forming means for copying the original document;

an input device separate from said copy device for inputting programmed control data;

a memory device which is attachable to and detachable from said copy device and said input device and is capable of storing the input programmed control data therein and feeding out the stored data therefrom;

said memory device storing the input data therein when said memory device is attached to said input device; data

said memory device feeding out the stored therefrom to said copy device when said memory device is attached to said copy device; and

a control device for controlling said copy device based on the data fed by said memory device.

11. An image forming apparatus comprising:

memory device capable of storing image forming data;

main body including an image forming means and a memory device receiving portion, said memory device being attachable to said receiving portion;

means for reading out the data stored in said memory device attached to the receiving portion and for controlling the image forming means based on the read out data; and

means for ejecting said memory device from the receiving portion after the data is read out.

12. An image forming apparatus comprising:

memory device capable of storing image forming data;

main body including an image forming means and a memory device receiving portion, said memory device being attachable to said receiving portion;

means for reading out the data stored in said memory device attached to the receiving portion and for controlling the image forming means based on the read out data; and

means for ejecting said memory device from the receiving portion after the completion of image forming operation based on the read out data.

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